Emergency Medical Services (EMS)   Maine Rural Health Research Center (MRHRC)

Fall 2017

Community Paramedicine Pilot Programs: Lessons from Maine

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Recommended Citation

COMMUNITY PARAMEDICINE PILOT PROGRAMS: LESSONS FROM MAINE

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ABSTRACT

Community paramedicine programs are beginning to flourish across the nation, and the need to provide demonstration or pilot programs is essential to providing a consistent and high-level standard for this model of care. While the overarching goals are to align with the Triple Aim, piloting a community paramedicine program also allows each community to develop and implement a program tailored to the healthcare needs of their specific community. A successful program builds the evidence base that can then be used to create legislative change necessary to financially sustain this model of care across the healthcare delivery system. This article provides a discussion of the healthcare needs of people living in rural areas and of the ways in which community paramedicine can address some of those needs. This article begins with a discussion of legislative authorization and characteristics of the Maine community paramedicine pilot program, the general strategies for implementation, and lessons learned from these programs. A case study of a Maine community paramedicine program provides an example of key implementation strategies along with structural and operation functions of the program that may be useful for other community paramedicine pilot sites looking to implement a community-based health care program.

Hospital readmissions and frequent non-urgent emergency department visits are huge factors in the rising cost of healthcare, and finding ways to reduce them involves innovative healthcare solutions across the healthcare delivery system. Community paramedicine (CP) is one model of community-based healthcare innovation, having as one of its primary goals the reduction in non-urgent 911 calls, which will, in turn, help in reducing the cost of emergency department care. In rural areas, CP programs also help fill gaps in the local healthcare delivery system due to shortages of primary care physicians. Additionally, CP programs provide trained EMS personnel working within the healthcare system to monitor patients at high risk for hospital readmission, help these high-risk patients manage their chronic diseases, comply with medication regimens, and access social services to help keep them in their home. These efforts seek to align with the "triple aim" of reducing healthcare costs, improving the health of the population, and enhancing patient quality and experience (Institute for Healthcare Improvement, 2016).

CP programs are beginning to flourish across the nation, and the need to provide demonstration or pilot programs is essential to providing a consistent and high-level standard for this model of care. While the overarching goals are to align with the Triple Aim, piloting a community paramedicine program also allows each community to develop and implement a program tailored to the healthcare needs of their specific community. A successful program builds the evidence base that can then be used to create legislative change necessary to financially sustain this model of care across the healthcare delivery system.

In this article, we begin with a discussion of the healthcare needs of people living in rural areas and how CP can address some of those needs. Next, we outline the legislative authorization and characteristics of the Maine

CP pilot program, evaluation of those programs, general strategies for implementation, and lessons learned from these programs. Finally, we tie these together in a case study of one CP program, with attention to key strategic considerations.

Nationally, persons residing in rural areas are reported to have poorer health status and higher rates of chronic illness than their urban counterparts (Pleis & Lethbridge-Cejku, 2007; Ziller, Coburn, Loux, Hoffman, & McBride, 2003). Hospital readmission rates are high for all Medicare beneficiaries, and research has shown that nearly one in five patients are readmitted within 30 days of discharge, with many more returning to the emergency room (Goodman, Fisher, & Chang, 2013; Jencks, Williams, & Coleman, 2009; Mor, Intrator, Feng, & Grabowski, 2010). For rural residents this has fatal consequences; among adults admitted to hospitals for a heart attack, rural residence is associated with higher rates of death (Agency for Healthcare Research and Quality, 2011). A shortage of physicians and other healthcare professionals in rural areas creates challenges to rural residents' ability to access healthcare services in a timely manner (Choi, Blumberg, & Williams, 2016; Doescher, Fordyce, Skillman, Jackson, & Rosentblatt, 2009; HRSA Data Warehouse, 2013; National Advisory Committee on Rural Health and Human Services, 2010). Compared to urban areas, rural communities have lower availability of primary care, and particularly specialty care, posing challenges to obtaining needed services for some rural residents (Fordyce, Chen, Doescher, & Hart, 2007). Individuals living in rural areas are more likely to defer needed health services due to cost (Bennett, Olatosi, & Probst, 2008); and rural residents, particularly those in remote counties or disadvantaged regions of the country, historically have had higher uninsured rates than their urban counterparts (Lenardson, Ziller, Coburn, & Anderson, 2009). Community paramedicine (CP) addresses

many of these challenges, providing an innovative model of community care that helps bridge the gaps between settings of care (Boutwell, Jencks, Nielsen, & Rutherford, 2009; Choi et al., 2016; Iezzoni, Dorner, & Ajayi, 2016; McDonald et al., 2010).

COMMUNITY PARAMEDICINE
IN RURAL AREAS AND IN MAINE

This section looks at the nature of community paramedicine services in rural areas in contrast to urban areas, and specifically in Maine, where nine of the twelve community paramedicine sites are located in rural areas. We then discuss Maine's development of the concept of community paramedicine, the ensuing authorizing legislation and the application process.

Community paramedicine is considered to be a way to fill the gap in rural areas due to the limited availability of primary care services or the lack of them entirely. As noted by participants at the National Consensus Conference on Community Paramedicine,

> "Community paramedicine providers care for patients at home or in other non-urgent settings outside of a hospital under the supervision of a physician or advanced practice provider. Community paramedicine can expand the reach of primary care and public health services by using EMS personnel to perform patient assessments and procedures that are already in their skill set" (Patterson & Skillman, 2013).

The specific roles and services of a community paramedic are determined by community health needs and in collaboration with local public health departments and medical directors, thus directly meeting the healthcare delivery needs of the community (Pearson, Gale, & Shaler,

2014). Volume of community paramedic referrals tends to be higher in urban areas where the population density is greater and the focus is on avoiding unnecessary ambulance transports or reducing wait times in the Emergency Department (ED) (Medstar Emergency Services, 2013; Medstar Mobile Healthcare, 2015). In contrast, community paramedicine programs in rural areas tend to address the shortage of primary care providers and the geographic distances to the nearest hospital (Iezzoni et al., 2016). Additionally, rural community paramedicine programs make use of the non-emergent time of paramedics during their duty roster.

Maine's State-wide Community Paramedicine Initiative
Maine is considered one of the "oldest" states in the nation. According to the Census Bureau, in 2014, 18.3 percent of Maine's population were 65 years and over (United States Census Bureau, 2016). Maine is also considered a rural state, with 11 of its 16 counties considered rural and 42 percent of the population living in rural areas. Rural counties in Maine tend to have higher rates of poverty and lower median incomes (United States Department of Agriculture, 2016). Maine's community paramedicine initiative can help fill a gap in the healthcare needs for this population, with the majority of the Maine community paramedicine pilot sites located in rural areas.

The concept of community paramedicine in Maine had its genesis as the 2004 report, *Rural and Frontier EMS Agenda for the Future* (McGinnis, 2004), and was a topic of conversation at the state level. A number of key actors in the Maine EMS—both current and former, and currently active in the national effort to promote community paramedicine—had discussed this concept for Maine for well over a decade. The release of the 2004 report spurred forward movement to their conversations and to the idea of community paramedicine in Maine. The emerging national

groundswell for community paramedicine gained traction in 2008, but it was not until 2010 that potential funding and regulatory stakeholders in Maine were identified and approached. These stakeholders included members of the Maine EMS Medical Direction and Practice Board, the Maine State Board of Nursing, the Maine Hospital Association, the Maine Medical Association, hospital administrators, emergency department physicians, home health providers, EMS providers, primary care physicians, the state office of rural health, representatives from MaineCare (Maine's Medicaid program) and Cigna. A task force was established along with a Steering Committee and all agreed that community paramedicine would not compete with other healthcare providers (such as home health), but would have as their primary goal filling unmet community healthcare needs.

The task force developed a proposal in October 2011 for a CP pilot program to present to the Maine EMS Board for approval. However, the Attorney General's office conducted a review of state and federal EMS legislation and concluded that CP was not included in the original enabling legislation. Working with the Governor's office, Maine EMS submitted a bill to the Maine Legislature which was approved in 2012, entitled, *An Act to Authorize the Establishment of Pilot Projects for Community Paramedicine* (Pub. L., Chapter 562, LD 1837, 2012).

The legislation granted the Board of Emergency Medical Services the authority to approve up to 12 CP pilots for a period of up to three years. As a result, Maine was now uniquely positioned as one of the first states to provide statewide legislation authorizing this many community paramedicine pilot projects.[1] The Board of

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[1] Currently California and South Carolina are also piloting statewide community paramedicine programs.

Emergency Medical Services approved the application process developed by the Maine EMS Office to enable local emergency medical services to apply to become a CP pilot site. All licensed EMS providers were eligible to participate in the pilot project within the scope of their current Maine EMS defined practice. The legislation did not, however, provide funding for the CP pilot projects; in applying to become a pilot project, the potential applicants were to assume all costs.

Definition of Maine's Community Paramedicine Pilot Project

Community Paramedicine is defined by Maine's authorizing legislation as the "practice by an emergency medical services provider primarily in an out-of-hospital setting of providing episodic patient evaluation, advice and treatment directed at preventing or improving a particular medical condition, within the scope of practice of the emergency medical services provider as specifically requested or directed by a physician" (An Act to Authorize the Establishment of Pilot Projects for Community Paramedicine, 2012). It should be noted that CP does not expand the scope of practice, which is established by the Maine Medical Direction and Practices Board; it simply expands the sphere of practice. The sphere of practice refers to the environment in which EMS personnel typically practice their trade, which is usually in emergency settings and on ambulance transports. Essentially, then, the community paramedic works within his or her defined skill set (scope of practice), but is now allowed to provide those skills in a non-emergent, home-based setting (expanding the sphere of practice).

Maine EMS Rules regarding pilot projects further indicates that

> "for the purpose of evaluating the workability and appropriateness of incorporating a particular

emergency medical treatment technique or a type of equipment into any licensure level, the Board may elect to exempt a service from the requirements of the relevant licensure level so as to permit the service to utilize the designated techniques or equipment on an experimental basis. Such authorizations may be continued at the discretion of the Board but will be limited to a maximum of three years. Such authorizations should not be construed as levels of licensure" (Maine Department of Public Safety).

This rule allows EMTs to practice as community paramedics and therefore did not require Maine EMS and the Medical Direction and Practices Board to establish a licensure level for community paramedics.

According to the application process, each EMS service in the CP pilot program was required to include a primary care physician and an EMS medical director as part of their pilot project for training, staffing, and quality assurance purposes. All applications were to provide a general description or narrative of the proposed pilot project, and specific plans for:

- patient interaction
- staffing
- training
- medical direction and quality improvement
- data collection

Applicants were to indicate the types of services they would provide within their respective scope of practice and based on identified community needs. Table 1 provides a description of the 12 Maine Community Paramedicine pilot sites with their affiliation (hospital-based, private, volunteer, etc.) and their start dates. Table 2 identifies the activities or services that each site provides.

Table 1
Maine Community Paramedicine Pilot Site Descriptions

Maine Community Paramedicine Pilot Project	Affiliation	Start Date
Calais Fire and EMS (Calais)	Municipal (Fire-Rescue)	8/12/2013
Castine Fire Rescue (Castine)	Volunteer	8/1/2013
Charles A Dean EMS (Greenville)	Hospital-based	10/1/2013
Crown Ambulance (Presque Isle)	Hospital-based	5/12/2013
Greater Kennebeck (Delta/Winthrop EMS services) (Augusta & Winthrop)	Private EMS Service	3/18/2013
Lincoln County Healthcare (Damariscotta, Boothbay Harbor & Waldoboro)	Mix of hospital and healthcare system and 3 local EMS services	3/1/2014
Mayo EMS (Dover-Foxcroft)	Hospital-based	10/1/2013
NorthStar EMS (Farmington)	Hospital-based	11/1/2013
Northeast Mobile Health (Scarborough)	Private EMS Service	6/1/2013
Searsport (Searsport)	Private EMS Service	12/26/2013
St. George EMS (Tenant's Harbor)	Volunteer (some paid staff)	6/1/2013
United Ambulance (Lewiston)	Private EMS Service	5/8/2013

Table 2 below provides an overview of the services the 12 Maine Community Paramedicine pilot sites provide.

Table 2

*Services Provided by the Maine Community Paramedicine Pilot Sites as of 2015*

	C.A. Dean	Calais EMS	Castine	Crown Ambulance	Greater Kennebec	Lincoln County	Mayo	North East	Northstar	Searsport	St. George	United Ambulance	TOTAL
Medication Reconciliation		x	x		x	x	x	x	x		x	x	9
Diabetes Care	x	x		x	x	x	x			x	x	x	9
Fall Risk Assessment & Home Safety		x	x		x	x		x		x	x	x	8
Monitoring Vitals Physical Exam			x		x	x	x	x	x		x	x	8
Wound Care Surgical Follow-up		x	x		x	x	x		x		x	x	8
Blood Draws		x			x	x	x				x	x	6
Vaccine Administration					x	x	x		x	x		x	6
CHF Care	x	x		x	x		x					x	6
COPD Care	x	x		x	x						x	x	6
Asthma Management	x			x	x						x	x	5
Diet & Weight Monitoring			x			x	x					x	4
Hypertension	x	x									x	x	4
Edema Assessment						x						x	2

EVALUATION OF THE MAINE COMMUNITY PARAMEDICINE PILOT PROGRAM

In this section, we describe the evaluation framework and strategies used in the evaluability assessment, providing the context for developing our interview protocol and reviewing the community paramedicine program at both the state and individual pilot site level.

In November 2014, the Muskie School of Public Service at the University of Southern Maine was awarded a contract to conduct an evaluation assessment of the implementation of the statewide CP Pilot Program in Maine, reporting on process level results from interviews with the twelve community paramedicine pilot sites in Maine and with the state of Maine EMS office. The research evaluation team used the Centers for Disease Control and Prevention's Framework for Program Evaluation in Public Health as a guide for our assessment (Centers for Disease Control and Prevention, 1999). The framework includes the following six interdependent steps and is shown in Figure 1.

Figure 1
Evaluation Framework

Steps in the Evaluation Process
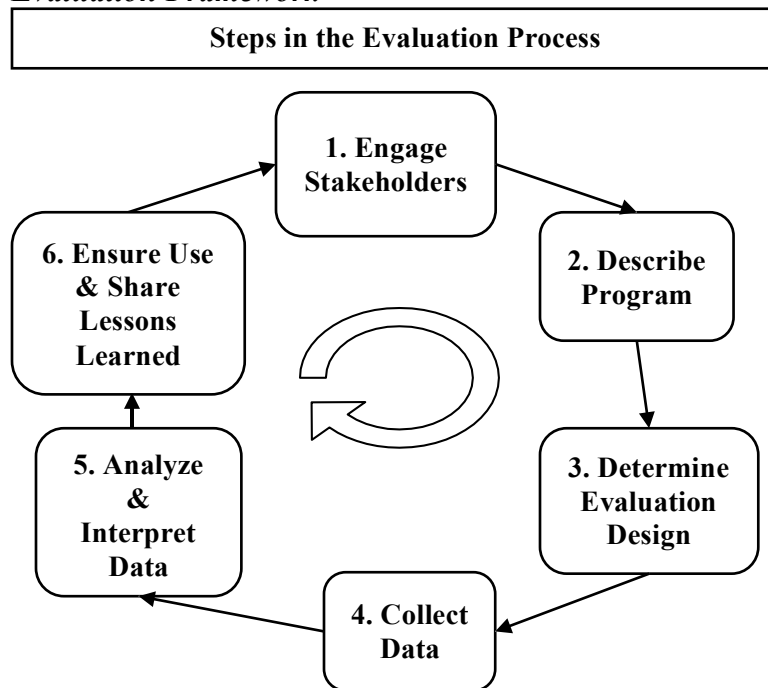
Additionally, we reviewed the literature on evaluability assessments to guide our work and use as a backdrop for understanding the strategies of the pilot sites (Leviton, Khan, Rog, Dawkins, & Cotton, 2010; Shadish, Cook, & Leviton, 1991; Trevisan & Hauang, 2003; Wholey, 1979; Wholey, Hatry, & Newcomer, 2004). The CDC Framework is built from the same core evaluation principles as evaluability assessment, aligning in particular with the engagement of stakeholders, description of the intended program, evaluation design and gathering of credible evidence (Wholey, 1979). Evaluability assessment provided an approach which enabled us to view the overall program and the individual pilot sites and help deal with the potential challenges of stakeholder disagreement, unclear underlying logic of the program, unrealistic goals and objectives in relation to resources available, and the ability to measure program effectiveness.

We developed the logic model (Figure 2) below as a guide to visually portray the goals and strategies of the statewide community paramedicine program.

We also developed a questionnaire and interview protocols based on the HRSA *Community Paramedicine Evaluation Tool* (Office of Rural Health Policy, 2012). The interview protocol was approved by both the University of Southern Maine Institutional Review Board (IRB) and the Maine EMS Board. Interviews were arranged with each site's CP coordinator and key personnel involved in the CP initiative, including the EMS director, primary care physician, and other community paramedics as available. For the majority of the interviews, only one or two staff were able to be interviewed; in a few cases, the CP pilot site's medical director was present. The interviews with the 12 CP pilot sites took place between February and March, 2015. All interviews were recorded and transcribed for analysis purposes.

Figure 2
Maine EMS Community Paramedicine Pilot Program Logic Model
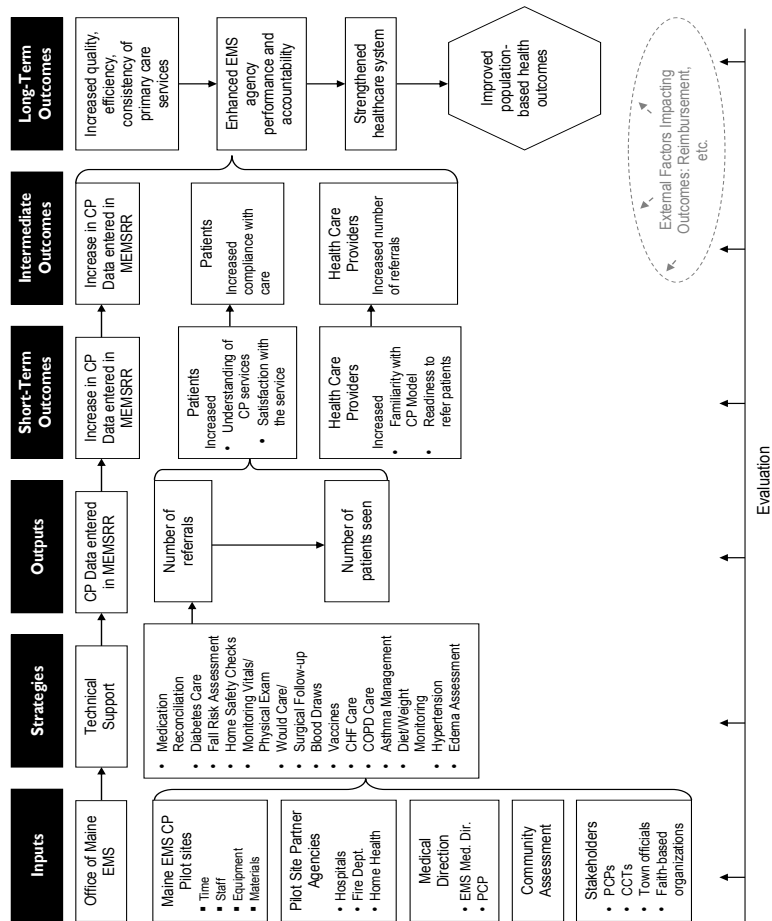
We monitored the number of CP home visits (or "runs" in the general EMS terminology) between the third quarter of 2013 through the fourth quarter of 2015 by analyzing data from the Maine EMS Run Reporting System (MEMSRR). Additionally, we reviewed all the pilot site

applications to ascertain how the pilot sites planned to implement and staff their respective programs. The results from the reviews were compared to interview findings to determine whether changes had been made at the pilot site level, and how the pilot sites implemented their programs.

IMPLEMENTATION STRATEGIES OF THE MAINE EMS COMMUNITY PARAMEDICINE PROGRAM

This section highlights implementation strategies from our interviews especially regarding staffing, stakeholder and partner involvement, and issues surrounding data collection and cost.

Staffing
Many of the pilot sites are small EMS agencies in terms of the number and types of staff, with a mix of EMT and paramedics with both basic and advanced lifesaving skills (BLS and ALS). The variation across the sites also includes a mix of paid (salaried and per-diem) and volunteer staff. This allowed the EMS agencies the flexibility to meet the needs of their community through their available staffing. Many of the CP pilot sites implemented their program with staff during the normal duty roster, thus making use of the non-emergent time during the week. Each pilot project designated a staff person as the community paramedicine coordinator. In many of the smaller agencies, the coordinator was often the EMS chief or the assistant chief. In the case of United Ambulance, a larger EMS agency, the CP lead is the Prevention and Wellness Coordinator, who reports to the Director.

Stakeholders and Partners
Stakeholders and partners are critically important in the development and implementation of community

paramedicine efforts. The primary care physician (PCP) is a key stakeholder vital to the success of the CP initiative. However, several CP sites reported that obtaining the buy-in from the PCP, who authorizes the referral, as well as from the hospital, is oftentimes a difficult process. All pilot sites noted the need to develop relationships in the community, not just with the healthcare providers, but also with local social services and faith-based organizations.

Home health agencies typically see CP providers as potential competitors, but those CP pilot sites that brought home health into the stakeholder group or contacted them prior to the implementation of their CP pilot project engendered the support of the local home health service. It should be noted that none of the CP pilot sites sought to replicate or duplicate home health services, and were explicit in their applications that all CP services were episodic and only within their EMS scope of practice. In the case of Delta Ambulance (Greater Kennebec CP pilot site), the PCP for the pilot project has a good relationship with both home health and the CPs, and makes sure that the home health agency is aware of the CP services. Additionally, at the Greater Kennebec CP pilot site, when home health knows a patient is ending their coverage with home health but are still not able to fully function or get out of the house to the doctor's office, they contact the PCP to suggest that this patient may benefit from a CP visit.

Another example of the stakeholder collaboration is the CP pilot program at Lincoln County Healthcare. In their application they stated,

> "By partnering with the primary care provider, the local hospital, home health and other social service agencies, the ability to reach this population will be greatly enhanced. Additionally, the unique collaboration among many partners will help to reduce duplication in our system by

ensuring that patients are receiving care from the appropriate agency."

The importance of stakeholders in the CP program cannot be overstated. These community members, through their positions on hospital boards, social service agencies, and faith-based organizations, are integral to the public perception and buy-in regarding the value of the CP program.

Data Collection

Data Collection is an area in which the CP program overall, as well as the individual sites, struggles. Finding ways to improve the data collection system both at the individual and state level is important. CP pilot site representatives have met (and continue to meet) to share their experiences, frustrations, and recommendations for how to make the reporting of CP data more efficient and effective.

In order to understand the complexity of CP reporting, we provide here a bit of background on the MEMSRR system and the challenges of using it for CP. The MEMSRR System was designed long before the CP pilot program was launched as a tool to detail transport and emergency care information, something CP projects do not do. MEMSRR was modified soon after the statewide pilot program commenced by adding an additional tab labeled Community Paramedicine to its list of types of services requested to enable the individual pilot sites to capture information on their CP pilot programs. However, MEMSRR does not include a category for provider impression or response disposition for CP home visits. Most CP pilots use "No Apparent Illness/Injury" and "No Treatment Required," neither of which reveals significant details about the nature of the visit. Currently, MEMSRR

does not allow the user to provide any information about repeat patients or longer-term outcomes.

The MEMSRR system does not easily enable the user to determine how many unique individuals have been served by the CP pilot sites. An individual EMS provider can set up a report that includes the patient's name and thus account for their service's repeat calls. However, it was not possible for us as the research evaluation team to determine the total number of unique patients accounted for by the 3,775 total home visits during the pilot program in order to develop an overall cost-avoidance formula. Further, estimating emergency room cost avoidance is problematic since many of the CP home visits are non-emergent.

Another inefficiency in the reporting process is that many pilot sites print their CP information from MEMSRR and fax it to the patient's PCP. While this practice is fairly common, not all CP pilots fax the visit information to the patient's PCP on a consistent basis.

For EMS agencies that are part of larger healthcare systems, MEMSRR presents additional challenges. The system is not easily linked with electronic medical record systems and as a result it requires health systems to navigate between two or more systems, presenting some barriers to coordinating care when patients are transferred from one clinic to another within a system.

Suggestions to improve the efficiency of CP reporting include the development of a more robust statewide data collection system along with training and instructional materials. This would help the statewide CP pilot program track trends in the number of CP visits and types of CP services provided by current and future pilot sites. Additionally, all the CP pilot sites would benefit from additional guidance from the Maine EMS on user-friendly tools regarding what to collect and when.

Since many CP patients are repeat patients, adding a feature that allows the ability to look at these repeat

patients and longer-term outcomes would be beneficial, according to the participants interviewed. The inability to track repeat visits to the Emergency Department and/or repeat users of a CP service was a concern for more than one site. Many CP sites reported MEMSRR to be a cumbersome data collection tool, and most sites expressed frustration at not being able either to enter data appropriately or utilize the data to produce reports that could show patient progress.

In sum, a more robust data collection and tracking tool that provides the ability to enter data on patient outcomes and repeat encounters would help individual CP projects as well as the statewide oversight of the CP program. Continued conversations and dialogue among the pilot sites and the state EMS office would enhance the ability to develop and sustain an effective CP data collection effort.

Determining the Cost and Value of a CP Project

Because the healthcare services the community paramedic provides is prevention-oriented (keeping the patient out of the ED or from being readmitted to the hospital), many pilot sites noted the difficulty in putting a cost on this service. As a way of tracking this data, at least one of the sites was developing a checklist for the criteria they use to determine when their CP visits qualify as preventing an ambulance transport, trip to the ED, or hospital admission.

To help in understanding the potential value the CP pilot sites provide to the healthcare delivery system in terms of prevented hospital readmissions, we developed a worksheet to determine site-specific costs of providing a community paramedicine program. Additionally, we obtained data from the Maine Health Data Organization (MHDO) for calendar year 2013 data regarding the number of hospital admissions (for any reason), length of stay, and

total amount paid by Medicare (facility cost only). We used the Medicare data since the majority of the CP population served across the pilot sites are Medicare eligible. We suggested that this MHDO data be used in a cost-avoidance formula by each CP pilot site in which they plug in their number of patients and the number of transports avoided specific to their project.

The general cost-avoidance formula was developed by the MedStar Mobile Healthcare team in Fort Worth, Texas (Medstar Mobile Healthcare, 2015). Essentially, MedStar's data analysis reporting looks at the cost, or the amount paid, for delivering the service and the expenditure, or the amount paid, for the service provided. Thus, the general cost-avoidance formula can be calculated as follows:

Figure 3
Cost-Avoidance Formula

Cost Avoided per patient $= \frac{(C_A + C_{ED}) * TA}{P}$

$\quad$ $C_A + C_{ED}$: Average Transport Cost (Ambulance Cost + ED Cost)
$\quad$ TA: Number of Transports Avoided
$\quad\quad$ (This number is determined by the CP pilot site)
$\quad$ P: Number of Patients Enrolled

Example:
($367.04 + $492.54) $*$ 52 transports avoided = $44,698.16 **total savings**

$$\frac{(\$367.04 + \$492.54) * 52 \text{ transports avoided}}{121 \text{ patients enrolled}} = \$369.41 \text{ \textbf{savings per patient}}$$

To calculate the cost savings for preventing hospital readmissions, the general formula looks at the average hospital readmission cost and the number of transports avoided.

Figure 4
Cost-Avoidance Formula for Hospital Readmissions

Cost Avoided per patient $= \frac{(C_{RA})*TA}{P}$

C_{RA}: Average Hospital Readmission Cost
TA: Number of Transports Avoided
    (This number is determined by the CP pilot site)
P: Number of Patients Enrolled

Example:

$3,476 * 52$ transports avoided$=\$180,752$ **estimated total savings**

$\frac{\$3476 * 52 \text{ transports avoided}}{121 \text{ patients enrolled}} = \$1,494$ **average savings per patient**

Using MHDO data for calendar year 2013, the following formula is used to calculate the **average cost per admission:**

Total Paid by Medicare (Facility costs only) ÷ Number of Admits
Example for a selected hospital: $9,993,169 ÷ 2875 = $3,476

To calculate the **average daily cost:**
    Use the total from above ÷ Average Length of Stay
    Example: $3,476 ÷ 4 = $869

LESSONS LEARNED

Here we look at the significant contributions to the community paramedicine program in Maine, and offer lessons learned during the implementation of the pilot program for other states and organizations to take into consideration when developing their own community paramedicine programs. Overall, the CP pilot program in Maine has highlighted the need for innovative solutions to integrated care coordination for patients with chronic conditions who are at high risk for unnecessary ED use

and/or re-hospitalizations. Among the key lessons learned are the following:

1. Implementing a statewide community paramedicine project requires significant effort.
2. CP data collection plans and efforts were inconsistent across sites.
3. Determining the cost savings attributable to the CP pilots was not possible.
4. Obtaining buy-in from local physicians for the CP pilots continues to be a challenge at some sites.
5. Patient satisfaction assessments would be helpful.
6. Resources are needed at the state level to provide training and technical assistance.

Implementing the statewide community paramedicine pilot program took significant effort, especially with regard to the legislative changes needed to authorize up to 12 pilot sites. The ongoing conversations and building of stakeholder relationships at the state and national levels were critical to the success in passing this legislation and recruiting the individual EMS agencies to be part of the statewide CP Pilot Program.

An internal team, consisting of the Maine EMS staff, a contracted coordinator, and the Steering Committee, was in place to develop the RFP, provide guidance for the individual pilot sites, and to review applications. The Steering Committee continued to meet to review new applications and any changes to existing CP projects. The Maine EMS staff consisted of the state EMS director and a staff person whose time was partially allocated to the CP pilot program to assist with the modified run (visit) reports for CP in MEMSRR and any other technical aspects. Allocating additional technical support would have been helpful to meet the needs of the pilot projects, especially with regard to the MEMSRR system CP modifications.

Data collection was problematic for many of the sites. The applications for the CP pilot projects specified that each individual pilot site was to prepare a data collection plan, but there was little overall guidance from the EMS office on specific data points needed in order to track the effectiveness of the statewide program across the individual sites. Thus, there was inconsistency in the data collection plans and efforts across the pilot sites.

One of the goals of this pilot program was to determine the cost of the CP program at the individual pilot site level as a measure of the value that the CP program brings to the community. We anticipated that this information, when fully collected, would be valuable to each CP pilot project as a way to both budget for the CP service and market it to the community. Additionally, this information, along with a robust and detailed data collection plan, would be beneficial to the state as part of each new CP pilot project application. However, this information was difficult to capture due to the inconsistency mentioned above. In order to evaluate cost savings in a more rigorous manner, we recommend conducting a study which compares a control group of non-CP enrolled patients against those enrolled in a CP project over a determined period of time. The comparison also would look at short-term and long-term health outcomes for these patients as an additional measure of the value of a CP program.

As noted earlier, buy-in from physicians for the CP pilot project was a struggle for many of the pilot sites, even though each site was required to have a PCP on their team. Several of the pilot sites discussed the need to continually educate and inform area physicians as well as hospital and emergency department personnel of the nature of the CP program and the need to connect patients with their PCP as part of the process. Outreach and marketing the program was a challenge for some of the CP pilot sites, and as a

result, the volume of referrals from the PCPs to the CP program was low.

There is an abundance of anecdotal information regarding the effectiveness of the program at the individual pilot site level, especially regarding patient satisfaction, but little documented evidence to support it. Several of the pilot sites indicated an interest and plan to administer a patient satisfaction survey, but at the time of our assessment, none had done so. This is an area in which the Maine EMS office could have provided guidance early on in the implementation process.

Resources, in terms of funding and staffing, are needed at the state level to continue implementing the statewide CP program. As can be seen from the lessons learned during the first half of the pilot program, resources directed to developing tools and training to guide individual pilot sites in data collection and outreach efforts may have helped the pilot sites garner buy-in earlier on in their process and provide the ability to show concrete value of their program.

These individual pilot site successes, when seen as a whole, would then provide the necessary documentation for the state to continue to move forward in formalizing this pilot program. We turn next to look more closely at one of the pilot sites in Maine in an effort to understand some of the key strategic considerations that provide a foundation for success and sustainability. This pilot site is also an example of how a community paramedicine program can develop in close collaboration with healthcare providers in the area.

UNITED AMBULANCE'S
COMMUNITY PARAMEDICINE PROGRAM

United Ambulance was chosen as a "best practice" model in part due to the commitment by the executive

director to build this program as an integral part of the service package they provide to the community. The data collection efforts and strong collaborative ties to healthcare organizations in the community were other components that highlight this CP pilot site as an example for others. By examining the structural and operational functions of United Ambulance's community paramedicine program, other EMS organizations may find ways to build or enhance their own community paramedicine efforts.

United Ambulance Service, based in Lewiston, Maine, is one of Maine's largest providers of medical transportation services, and serves both rural and urban areas in Androscoggin County. United Ambulance is jointly owned by Central Maine Medical Center and St. Mary's Regional Medical Center.

Androscoggin County has the fifth largest county population in Maine but the second smallest total area and is more urban than most of Maine, with more than half of the County's population residing in the "twin cities" of Lewiston and Auburn. Recent demographics indicate that 43.4 percent of Androscoggin County's residents live in rural areas, nearly 15 percent are 65 years of age or older, and nearly 16 percent live with a disability (Kahn-Troster, Burgess, Coburn, Wallace, Croll, & Gallo, 2016). Residents of the Androscoggin County are more likely to be living below the poverty line than the state average (Kahn-Troster, et al., 2016). Assessment of county-level health status using data from the 2015 County Health Rankings and the 2015 Maine Shared Health Needs Assessment and Planning Process (SNHAPP) Project indicate that the top areas of concern are obesity, asthma conditions resulting in hospitalization, substance abuse, diabetes, and heart failure (County Health Rankings, 2016; Maine SHNAPP Project Collaborative, 2015). These are the socio-demographic and health concerns that the community paramedicine pilot project at United

Ambulance is targeting, particularly asthma and heart failure.

United Ambulance's Community Paramedic (CP) program, which officially began in May 2013, is an outgrowth of a "Home Visit Program" they developed in 2011 as a way to reach residents in their catchment area who routinely use emergency services for non-emergency issues and who have limited access to social services or healthcare resources. This program was funded entirely by United Ambulance as a free service, and included well-being checks, monitoring of vital signs, home safety checks (injury risk assessments), medication reconciliation, patient education regarding self-care of their medical condition (usually a chronic condition such as diabetes, COPD or CHF), and a review of local services for which the resident may be eligible. These Home Visit Program services were carried into the Community Paramedicine pilot program in 2013, with the only major change being that United now required participation in the program to be authorized by the patient's primary care provider (PCP). The goals of United Ambulance's CP program are fourfold:

1. Ensure quality pre-hospital care through appropriate utilization of emergency medical services (EMS) for vulnerable populations;

2. Decrease unnecessary EMS transports to the emergency department (ED) while promoting preventive strategies and outreach through the use and promotion of primary care provider (PCP) services;

3. Collaborate with hospital partners to create a systematic approach to preventing 30-day readmissions for vulnerable patients that could be associated with financial penalties for such occurrences.

4. Develop a program that avoids duplication of existing services and promotes sustainability of

service by promoting appropriate access and utilization of PCP services and the decrease of readmission rates and associated penalties. Financial sustainability is linked to this goal through the use of preventive cost implementation/budgets in lieu of decreasing Medicare penalties for readmissions.
[*Source:* United Ambulance internal document]

United's CP program is staffed full-time by the Prevention & Wellness Coordinator who has completed a nationally recognized CP curriculum through the Colorado Mountain College Community Paramedic Program and received her certificate as a Community Paramedic. An additional paramedic is staffed part-time for the CP visits, with another on the roster as needed, both also with a nationally recognized CP certificate. As required by the state application for CP pilot sites, the local CP team also includes a primary care medical director (in this case a Nurse Practitioner from one of the two hospitals partnering with the program), United's Service Medical Director, and United's Community Paramedic Program Manager. The Executive Director of United Ambulance Service has final oversight on the CP program. This team provides the necessary quality assurance and performance reviews on a monthly basis for each CP visit.

Referrals to United's CP program can come from a variety of sources, such as home health, the community care team, the hospital, or cardio-pulmonary rehabilitation center, but ultimately the PCP needs to sign off on the order for the CP to visit the patient in their home. United's CPs have found that for those patients who have talked with their PCPs and have had the PCP mention the CP program, there is much less resistance in letting the CP visit in the home. One of the uses of the program by the PCP is to assess—be the eyes and ears of the physician—for a patient if that patient

can't get to the PCP's office that day or in a timely manner. All paperwork and any screening forms generated during the visit to the patient is submitted, usually via fax, to the patient's PCP, and the CP Coordinator will also follow-up with a phone call to the PCP.

Being owned by the area hospital system, United is able to capitalize on that affiliation by portraying their CP services as an extension of the hospital. They are working with their hospital partners to more formally build United Ambulance into the hospital systems. As the Executive Director noted, "we don't exist without the hospital system." One of the ways that has proven beneficial to United's CP program has been by having the CP go on rounds at the hospital for high-risk patients with chronic conditions who have been frequently admitted and who are ready to be discharged. Also, by being involved in the community stakeholders group—a coalition of 10-14 area agencies—the connections between healthcare agencies is made with the CP program along with a consistency of messaging in patient care from discharge to home visit.

The Director of Community Health, Wellness and Cardiac Rehabilitation at Central Maine Healthcare, a partner in the community coalition, has high praise for the work of United's community paramedics. She stated that

> "the unique aspect of these trusted paramedics going into a client's/patient's home to provide (free) services demonstrates a clear commitment to the care of a person in an environment that is most suited to his/her well-being. We know the stress people feel when they are not in their own homes and that many people are overwhelmed when in a hospital setting and are unable to comprehend what is being asked of them for their self- care. As a community paramedic evaluates the person in their home environment and provides the service in the space likely

comfortable to them, it promotes healing, buy-in, and an awareness of potentially unsafe situations. Many of these individuals use emergency services for general help and have little knowledge of or access to resources. We have had a community paramedic meet a patient while in the hospital and plan for service follow-up. This has eased the transition from hospital to home. It is a tremendous asset as we collaborate to avoid unnecessary readmissions" (personal communication, 2015)

Nationally, community paramedicine programs are being asked to show value by providing data on the cost benefits of their programs. One of the ways United Ambulance is striving to show value for the CP service they perform is through their data collection efforts and case study notes. While it is difficult to exactly determine whether a visit has causally resulted in a prevented hospital readmission or an unnecessary 911 call, United tracks the number of EMS 911 calls and transports for patients currently enrolled in the CP program, and compares them to the number of 911 calls and transports to the ED for these same patients prior to enrollment in the program. Figure 5 shows the reduction in both ED visits and 911 calls for a group of patients pre- and post-enrollment. Figure 6 shows the types of interventions provided by the United Ambulance CP and Figure 7 depicts the increase in number and type of referrals over time.

Figure 5
Comparison of Clients Before & After Enrollment in the United Ambulance Community Paramedicine Program, 2013-2014, n= 15
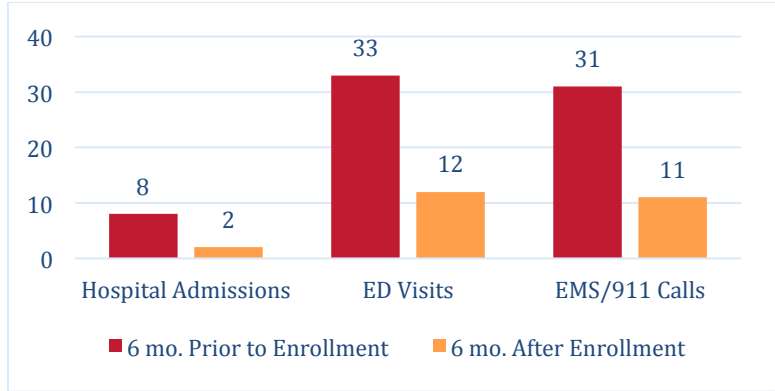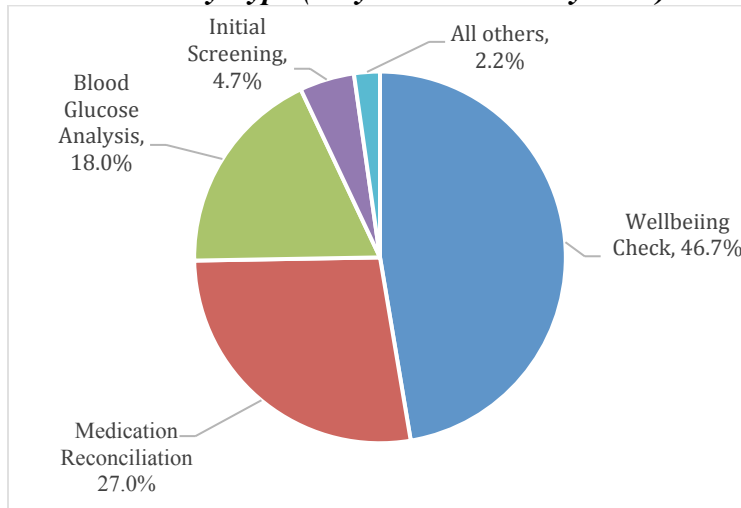
Figure 6
United Ambulance Community Paramedicine
Interventions by Type (May 2013 – January 2016)

Figure 7
United Ambulance Community Paramedicine
Interventions by Month (May 2013 – January 2016)

According to data collected by United Ambulance for their CP program, since the start of their program in May 2013 through April 2016, they visited 194 patients in their homes, avoiding 63 ambulance transports. For the eight heart failure patients enrolled in the program (5/1/15 – 4/11/16), only one was readmitted to the hospital within 30-days post-discharge.

Case notes are another way that United Ambulance collects data regarding CP visits, ambulance transports, ED and hospital readmission avoidance. According to case notes, one of the patients referred to United's CP program is an elderly woman with multiple chronic conditions resulting in several visits to the ED. Her PCP directed the CP to visit her on a weekly basis to help with medication reconciliation. In the twelve months prior to enrollment in to the CP program, the patient had been to the ED 8 times (7 by ambulance), with one hospital admission. Since enrollment, the patient called 911 only four times, resulting in no hospital admissions, thus showing a 50 percent reduction, and more importantly, a cost savings to the EMS system.

Calculating cost savings according to the formula mentioned previously (Figures 3 and 4) can be complex. A simple formula is to take the average hospital payment multiplied by the number of hospitalizations avoided and divide that by the number of patients enrolled. However, in the case of one patient who needed daily wound care treatment, this formula does not accurately depict the cost avoided. According to United's case notes, over the course of 45 days, the Community Paramedic was able to keep the patient out of the ED and hospital for a stretch of 18 days. The patient was then transported by ambulance to the ED and briefly hospitalized for 4 days. After discharge, the patient was seen at home for 11 more days before being transported to the ED once again. He was returned home that day. The CP saw him for another 6 days; he was seen

for lab work in the ED, and returned home that evening. The CP continued daily visits and this patient did not return to the ER or hospital during the remainder of this 45-day period. So, for this patient who previously had been hospitalized over 70 times and was a frequent user of the EMS system and the ED, the value that the CP provided by seeing the patient at home needs to take into account not only the number of hospitalizations avoided, but also the number of ambulance transports and ER visits avoided.

According to the Executive Director of United Ambulance, it is precisely these kinds of visits and results that help define the role they play as a community paramedicine program in the local healthcare system. They are looking to make an impact, as a "gatekeeper" of sorts, in reducing the number of ED visits and therefore reducing healthcare costs. Community paramedicine remains as one of the priorities in their service array, but, without a revenue base for it, sustainability of the program is challenging.

KEY FINDINGS FROM
THE UNITED AMBULANCE CP PROGRAM

As noted earlier, United Ambulance's CP pilot project was an outgrowth of their Home Visit Program. By building on existing stakeholder collaboration, United was able to forge stronger alliances with the local community care team/hospice agency as well as with the Community Health, Wellness, & Cardiopulmonary Rehabilitation Center at Central Maine Medical Center. Additionally, the CP Coordinator at United attends meetings of the community healthcare coalition, and in particular, the asthma subcommittee. This collaboration between the asthma subcommittee and United's CP program has resulted in the joint development of a new pilot project

targeting asthma patients, who have been shown to be high utilizers of the ED.

Additionally, the CP Coordinator has made face-to-face connections with the hospital discharge planners and physicians during her weekly visits to the hospitals, helping to assure buy-in for the CP program. These partnerships with key stakeholders, put in place early in the pilot project, are key to the success with which United Ambulance is able to garner CP referrals of home-bound patients.

The Chief Operating Officer at St. Mary's Regional Medical Center, one of the two hospitals that own United Ambulance, is pleased with the CP program and its emphasis on helping to reduce the cost of repeat emergency visits and hospital readmissions, especially for what she terms "people on the margin." She notes that United's CP program has exceeded St. Mary's expectations and plans to continue working with United Ambulance. "We in health care are trying to get better at managing needs and predicting what patients might need in the future. Community paramedics are a very value-added extension of that care" (Catholic Health Association of the United States, 2016).

Having staff dedicated full-time to CP visits, along with additional CP-certified paramedic staff, has helped in the smooth implementation for United Ambulance. The full-time CP Coordinator maintains the community outreach effort for the program and builds rapport with the hospitals, the PCPs, hospice, and local healthcare agencies. By enlisting the additional support of CP-certified paramedics, United Ambulance is able to meet the growing demand of CP visits, without having to spend the extra time in training their paramedics on assessing chronic diseases, for example. However, of most importance, is the organizational support for the CP pilot program. This commitment of the organization to fully invest their resources, time, and effort in this CP pilot project has

helped the pilot project continue. But, over the long term, financial sustainability remains a concern.

As of our midpoint review of the Maine CP program, United Ambulance has the highest volume of CP visits among all the Maine CP pilot sites, which in part may be attributable to the higher population density of their location compared to most of the other CP pilot projects. Because CP visits are provided only on the authorization of the PCP, this high CP volume directly reflects the relationship between the PCP and the CP program. As we have seen and heard from some of the other CP pilot sites, without the buy-in of the physician and the affiliated healthcare agencies, CP referrals and volume remain low.

The ability to accurately collect data is a challenge to the ongoing implementation and sustainability of United's CP program. This challenge is currently being addressed through connection to the state-wide Health Information Exchange, HealthInfoNet. As of early 2016, United had view-only access, but the plan is for United eventually to be able to document CP visit information directly on the patient's chart in HealthInfoNet. The ability to view the patient's full chart in real time and see the number of emergency department visits and discharge notes will have the effect of saving time at the CP visit and provide the confidence that the medical information on the patient is current.

LIMITATIONS

There are several limitations to this study, encompassing both process and outcome data. This evaluation was conducted in the middle of the 3-year pilot site program. As such, overall program assessment is limited to a retrospective look at the implementation of the statewide program. Individual pilot site assessments provided a snapshot of the implementation and progress

midway through the pilot program. Several sites were not very far along in their implementation of their CP program, and none had patient outcomes to report.

The Maine EMS Run Reporting System (MEMSRR), while useful for traditional EMS transport data, cannot be easily queried to enable the user to determine how many unique individuals or repeat visitors have been served by the CP pilot sites. Hence we were limited in our ability to track patient outcomes across the pilot sites.

Early in the evaluation process, we provided the pilot sites with cost tracking forms, with the goal to calculate individual and overall cost savings. Data requested include costs related to personnel, operations, training, and reimbursement rates. Unfortunately, the pilot sites were unable to provide detailed cost data, and therefore we were unable to determine overall programmatic costs and cost savings.

When the statewide CP pilot program first started, Maine EMS had expressed some interest in having the pilot sites administer patient satisfaction surveys. However a patient satisfaction survey template was not developed. Thus, the lack of a survey instrument precluded our ability to report patient satisfaction with the individual CP pilot programs.

Financial constraints limited the ability of many of the CP pilot sites and the Maine EMS office to develop the infrastructure to fully implement and sustain the pilot projects. The CP pilots did not receive any state funding to carry out their pilot projects. Maine EMS received some modest funding, through the Maine Office of Rural Health and Primary Care's Medicare Rural Hospitality Flexibility (Flex) grant program to develop the pilot. However, these resources were not sufficient to develop the infrastructure to fully carry out this pilot project.

CONCLUSIONS AND FUTURE RESEARCH

This point-in-time assessment of the Maine EMS Community Paramedicine Pilot Program has raised the need for innovative solutions such as this program to provide integrated care coordination for patients with chronic conditions who are at high risk for unnecessary emergency department visits and/or re-hospitalization. The statewide CP program can be considered a model for other potential CP pilot sites within Maine as well as for other states considering such a program.

Implementation of the 12 CP pilot sites included the ability to overcome initial legislative hurdles and has provided a foundation from which this program can move out of the pilot stage to a formalized and sustainable program. The lessons learned both at the statewide level and individually by the CP pilot sites provide opportunities for the enhancement of the program through a more robust and rigorous data collection system which will, in turn, provide the ability to determine cost savings to the healthcare system.

Moving from pilot state to a sustained program is the next step for many of the Maine CP pilot projects. Understanding the community needs and factors that enable a sustainable CP program provides an area for further research. Is there an established core of stakeholders that help ensure successful implementation of a CP program? How has the integration of EMS community paramedicine impacted the primary care practice? What is the actual cost to a community to provide a CP program and are there sustainable funding sources? At the national level, efforts are underway to develop a standard process for tracking and reporting uniform measurements related to community paramedicine. Using these defined measures, a community paramedicine program can begin to establish the evidence base to "demonstrate replication of successful

interventions/programs and to further build the evidence base for economic sustainability and program replication" (MIH Core Development Group, 2016). Further research is needed on the use and effectiveness of these measures, especially in rural-based CP programs.

An additional area for future research is to look at the difference between rural and urban areas in the provision of community paramedicine programs. Are there significant barriers to sustainability of these programs in rural areas as compared to urban? Do the types of services provided differ between rural and urban areas, and do the strategies to implement them also differ? Are there best practices across CP programs that can be replicated across diverse geographic communities?

We looked at staffing issues as part of the Maine CP pilot program and found that they used a mix of EMT and paramedics with both basic and advanced lifesaving skills (BLS and ALS) as well as a mix of paid (salaried and per-diem) and volunteer staff. Future research is needed regarding the CP workforce education and credentialing levels, and how this impacts the rural areas that rely on EMTs and volunteers.

As with the "triple aim," (Berwick, Nolan & Whittington, 2008), CP programs also aim to reduce costs, improve patient outcomes, and improve patient experience. However, there are few standardized patient satisfaction surveys for CP, and therefore development and testing them is an area for future research. More research is needed to understand how patient satisfaction with CP impacts patient outcomes, and ultimately how improvement in patient outcomes impacts the reduction of healthcare costs.

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